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Application Number	09/939,410
Filing Date	August 24, 2001
First Named Inventor	Joseph A. Kwak
Art Unit	2662
Examiner Name	Saba Tsegaye
Attorney Docket Number	I-2-0203US

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  - [ ] Affidavits/declaration(s)
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Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Jeffrey M. Glabicki Reg. No. 42,584 Volpe and Koenig, P.C.
Signature	
Date	April 12, 2004

CERTIFICATE OF TRANSMISSION/MAILING

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 330.00

Complete if Known	
Application Number	09/939,410
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METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 09-0435

Deposit Account Name: InterDigital Communications Corporation

The Director is authorized to: *(check all that apply)*

☒ Charge fee(s) indicated below ☒ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims		Fee from below	Fee Paid
Total Claims	-	=	X		=
Independent Claims	-	=	X		=
Multiple Dependent					=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

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FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330.00
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 330.00

SUBMITTED BY				(Complete *(if applicable)*)	
Name (Print/Type)	Jeffrey M. Glabicki	*Registration No. (Attorney/Agent)*	42,584	*Telephone*	215-568-6400
Signature				*Date*	April 12, 2004

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PATENT #17

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
	Joseph A. Kwak
Application No.:	09/939,410
Filed:	August 24, 2001
For:	PHYSICAL LAYER AUTOMATIC REPEAT REQUEST (ARQ)
Group:	2662
Examiner:	Saba Tsegaye

Our File: I-2-0203US

Date: April 12, 2004

APPEAL BRIEF

Mail Stop Appeal Brief -Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to the February 12, 2004 Notice of Appeal, Applicant hereby submits this Appeal Brief.

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APPENDIX A - Pending Claims 9-15

(1) REAL PARTY IN INTEREST

The real party in interest is the assignee of record, InterDigital Technology Corporation.

(2) RELATED APPEALS AND INTERFERENCES

A Notice of Appeal was filed on February 12, 2004 for U.S. Patent Application No. 10/085,203 which is a continuation of the present application. Other than that appeal no other appeals or interferences are known which will directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

(3) STATUS OF THE CLAIMS

Claims 1-31 are the subject of this appeal and are attached in Appendix A. No other claims are pending. Claims 1, 2, 4-6, 13, 14, 16-18 are finally rejected under 35 U.S.C. §102(e), as being anticipated by U.S. Patent No. 6,208,663 (Schramm et al.). Claims 3 and 15 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Schramm et al. in view of U.S. Patent No. 6,128,276 (Agee). Claims 7, 8, 11 and 12 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,529,561 (Sipola) in view of Schramm et al. Claims 19-21 and 29-31 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,021,124 (Haartsen) in view of Schramm et al. Claims 22 and 23 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm and further in view of U.S. Patent No. 6,522,650 (Yonge, III et al.). Claims 9 and 10 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Sipola in view of Schramm et al. and further in view of Agee. Claims 24-28 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm and further in view of Sipola.

(4) STATUS OF THE AMENDMENTS

No Amendments were filed after the November 13, 2003 Final Action.

(5) SUMMARY OF THE INVENTION

The invention adjusts data modulation in a wireless communication system. Data is received at a transmitter for transmission to a receiver (such as blocks 34a of Figure 3, see, for instance, paragraph [0015]). The received data is formatted into packets for transmission to the receiver (such as by Physical Layer ARQ Xmitters 12a, 26a of Figures 1A and 1B, respectively, see, for instance, paragraph [0015]). Each packet has a particular encoding/data modulation (such as per step 62 of Figure 2, see, for instance, paragraph [0015]). The packets are transmitted to the receiver (such as per antennas 13 and 25 of Figures 1A and 1B, respectively, see, for instance, paragraph [0015]). The packets are received at the receiver (such as per antennas 15 and 23 of Figures 1A and 1B, respectively, see, for instance, paragraph [0016]). For each received packet, an acknowledgment is generated and transmitted at the physical layer using a fast feedback channel (such as by ACK Xmitter 54 and FFC 45 of Figure 3, see, for instance, paragraph [0030]), if the received packet has an acceptable error rate (See, for instance, paragraph [0018]). That received packet is retransmitted at the transmitter, if an acknowledgment for that packet is not received (See, for instance, paragraph [0018]). Retransmission statistics are collected (such as by AMC Control 12C and 26C of Figures 1A and 1B, respectivel, see, for instance, paragraph [0020]). Each particular encoding/data modulation uses the collected retransmission statistics (see, for instance, paragraph [0020]). If the collected retransmission statistics indicate a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation (See, for instance, paragraph [0020]). If the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation (See, for instance, paragraph [0020]).

(6) ISSUES

(1) Do claims 1, 2, 4-6, 13, 14, 16-18 meet the requirements of 35 U.S.C. §102(e), as not being anticipated by U.S. Patent No. 6,208,663 (Schramm et al.)?

(2) Do claims 3 and 15 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Schramm et al. in view of U.S. Patent No. 6,128,276 (Agee)?

(3) Do claims 7, 8, 11 and 12 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,529,561 (Sipola) in view of Schramm et al?

(4) Do claims 19-21 and 29-31meet the requirements of 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,021,124 (Haartsen) in view of Schramm et al.?

(5) Do claims 22 and 23 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm and further in view of U.S. Patent No. 6,522,650 (Yonge, III et al.)?

(6) Do claims 9 and 10 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Sipola in view of Schramm et al. and further in view of Agee?

(7) Do claims 24-28 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm and further in view of Sipola?

(7) GROUPING OF CLAIMS

The claims on appeal consist of three groups. Claims 1, 2, 5-8, 11-14, 17-28 and 31 are in group one and claim 1 is the representative claim. Claims 3, 9, 15 and 29 are in Group 2 and claim 3 is the representative claim. Claims 4, 10, 16 and 30 are in Group 3 and claim 4 is the representative claim.

(8) ARGUMENT

Background

This application (U.S. Patent Application No. 09/939,410) was filed on August 24, 2001.

Group 1 (Claims 1, 2, 5-8, 11-14, 17-28 and 31):

Issue (1): Do claims 1, 2, 4-6, 13, 14, 16-18 meet the requirements of 35 U.S.C. §102(e), as not being anticipated by U.S. Patent No. 6,208,663 (Schramm et al.)?

Schramm et al. describes a change in FEC coding and/or modulation scheme at column 7, lines 1-12 as follows.

> If the quality of the connection is not sufficient for the current FEC coding and/or modulation scheme, then RBS 22 will select an alternate scheme for retransmission processing, in this example QPSK modulation, which is designed to have improved noise and/or interference resistance. For example, RBS 22 can count the number of requests for retransmitted blocks and only use the alternative FEC coding and/or modulation scheme when the counted number of erroneously transmitted blocks exceeds some predetermined threshold. If desired, the alternative FEC coding and/or modulation scheme can be implemented each time a retransmitted block is requested, i.e., the case where the predetermined threshold is zero.

(Emphasis Added). Essentially, Schramm et al. discloses that after transmission of a block fails a specified number of times, the block is transmitted using an alternate scheme having improved noise and/or interference rejection. Applicants respectfully disagree that counting a number of failed attempts of retransmitting a given packet constitutes "collecting retransmission statistics." Furthermore, the present invention adjusts to a higher capacity encoding/data modulation scheme in response to a low number of retransmission statistics. The scheme of the present invention allows for the system to achieve an optimum encoding/data modulation scheme using retransmission statistics. Applying Schramm et al. to a low retransmission environment would result in either no change to the scheme (the threshold not being exceeded) or, ironically, to a lower capacity scheme (if a retransmission is required and

the threshold is exceeded). Accordingly, Schramm et al. would never move to a higher capacity scheme based on acknowledgements or negative acknowledgements.

An argument was set forth that the resetting of the FEC/modulation scheme in Schramm is analogous to the lowering the modulation/coding scheme of the present invention. However, the present invention uses the retransmission statistics to adjust the encoding/modulation scheme. This is clearly different to resetting the scheme for each block of Schramm, which is performed automatically after a successful transmission.

With respect to representative claim 1, that claim recites using a fast feedback channel for the acknowledgements, which is not disclosed in Schramm et al. The use of the fast feedback channel allows for fast acknowledgement and fast adaptation of the encoding/modulation scheme to the channel conditions as reflected by the fast accumulating retransmission statistics.

With respect to issues 2-7, none of the additional references, Agee, Sipola, Haartsen and Yonge, III et al., cure this lack of Schramm's teaching. Accordingly, these claims meet the requirements of 35 U.S.C. §102(e) and 35 U.S.C. §103(a).

Group 2 (Claims 3, 9, 15 and 29):

With respect to Group 2, Agee is cited as disclosing the Orthogonal Frequency Division Multiple Access (OFDMA) elements of the claims. Although Agee mentions OFDMA in passing in Columns 4 and 5, it does disclose nulling sub-channels or, in particular, the nulling of the sub-channels as the adjusting of the modulation and coding scheme as previously described in context with Group 1.

Group 3 (Claims 4, 10, 16 and 30):

With respect to Group 3, Schramm is cited as disclosing the use of single carrier-frequency division equalization (SC-FDE). However, Schramm does not even mention SC-FDE, except that "the present invention is readily applied to all types of access

methodologies" at column 4, lines 51-53. Accordingly, Schramm does not even disclose an SC-FDE system.

(9) CONCLUSION

For the reasons stated above, pending claims 1-31 meet the requirements 35 U.S.C. §102(a) and 35 U.S.C. §103(a). Accordingly, the final rejection should be reversed. After reversal, Applicant respectfully requests that the pending claims be passed to allowance.

Respectfully submitted,

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By: _____
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APPENDIX A
(PENDING CLAIMS OF U.S. PATENT APPLICATION NO. 09/939,410)

1. A method for adjusting data modulation in a wireless communication system, the method comprising:

receiving data at a transmitter for transmission to a receiver;

formatting the received data into packets for transmission to the receiver, each packet having a particular encoding/data modulation;

transmitting the packets to the receiver;

receiving the packets at the receiver;

for each received packet, generating and transmitting an acknowledgment at the physical layer using a fast feedback channel, if the received packet has an acceptable error rate;

retransmitting that received packet at the transmitter, if an acknowledgment for that packet is not received;

collecting retransmission statistics; and

adjusting each particular encoding/data modulation using the collected retransmission statistics; wherein if the collected retransmission statistics indicate a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation.

2. The method of claim 1 wherein the particular encoding/data modulation is forward error correction (FEC) encoding/data modulation.

3. The method of claim 2 wherein the packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface and the particular FEC encoding/data modulation adjusting is performed in addition to selective nulling of subchannels in an OFDMA set.

4. The method of claim 1 wherein the packets are transmitted using a single carrier with frequency domain equalization (SC-FDE) air interface.

5. The method of claim 1 wherein the acknowledgments are transmitted on the fast feedback channel using a code division multiple access (CDMA) air interface.

6. The method of claim 1 further comprising at the receiver for each received packet transmitting a negative acknowledgment, if that packet has an unacceptable error rate.

7. A physical layer automatic request repeat system comprising:

a transmitter having:

a physical layer transmitter for receiving data, formatting the received data into packets, each packet having a particular encoding/data modulation, transmitting the packets, and retransmitting packets in response to not receiving a corresponding acknowledgment for a given packet;

an ACK receiver for receiving the corresponding acknowledgment; and

an adaptive modulation and coding (AMC) controller for collecting retransmission statistics and adjusting the particular data modulations using the collected statistics; wherein if the collected retransmission statistics indicate a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation; and

a receiver having:

a physical layer receiver for demodulating the packets;

a hybrid ARQ combiner/decoder for buffering, decoding and detecting packet errors; and

an acknowledgment transmitter for transmitting an acknowledgment for each packet, if that packet has an acceptable error rate.

8. The system of claim 7 wherein the particular encoding/data modulation is forward error correction (FEC) encoding/data modulation.

9. The system of claim 8 wherein the packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface and the particular FEC encoding/data modulation adjusting is performed in addition to selective nulling of subchannels in an OFDMA set.

10. The system of claim 7 wherein the packets are transmitted using a single carrier with frequency domain equalization (SC-FDE) air interface.

11. The method of claim 7 wherein the acknowledgments are transmitted on a fast feedback channel using a code division multiple access (CDMA) air interface.

12. The system of claim 7 further comprising at the receiver transmitting a negative acknowledgment, if any packet has an unacceptable error rate.

13. A physical automatic request repeat system comprising:

a transmitter having:

means for receiving data;

means for formatting the received data into packets for transmission to the receiver, each packet having a particular encoding/data modulation;

means for transmitting the packets to a receiver;

means for retransmitting one of the packets, if an acknowledgment for that packet is not received;

means for collecting retransmission statistics; and

means for adjusting each particular data modulation using the collected retransmission statistics; wherein if the collected retransmission statistics indicated a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicated a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation; and

a receiver having:

means for receiving the packets; and

means for each received packet, for decoding and error checking the received packet, and for generating and transmitting an acknowledgment at the physical layer, if that received packet has an acceptable error rate.

14. The system of claim 13 wherein the particular encoding/data modulation is a particular forward error correction (FEC) encoding/data modulation.

15. The system of claim 13 wherein the packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface and the particular FEC encoding/data modulation adjusting is performed in addition to selective nulling of subchannels in an OFDMA set.

16. The system of claim 13 wherein the packets are transmitted using a single carrier with frequency domain equalization (SC-FDE) air interface.

17. The system of claim 13 wherein the acknowledgments are transmitted on a fast feedback channel using a code division multiple access (CDMA) air interface.

18. The system of claim 13 further comprising at the receiver for each received packet, transmitting a negative acknowledgment, if that packet has an unacceptable error rate.

19. A communication system employing broadband fixed wireless access comprising:

a sequencer having a queue for receiving data blocks from the network for sequentially conveying packets to n transmitters;

a destination device having n receivers, each associated with one of said n transmitters;

n hybrid ARQ decoders each coupled with one of said n receivers;

said n transmitters subsequently transmitting to their associated n receivers through a data channel;

said n hybrid ARQ decoders having a feedback channel for transmitting acknowledgments to their associated transmitters for controlling retransmission and providing an acknowledge signal to its associated transmitter when an acceptable error rate packet has been received; and

said n hybrid ARQ decoders releasing packets which have an acceptable error rate; and

wherein the communication system collecting retransmission statistics and adjusting a particular encoding/data modulation for each of the N transmitter using the collected retransmission statistics; if the collected retransmission statistics indicated a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicated a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation.

20. The communication system of claim 19 wherein said n signal transmitters each temporarily store a packet that has been transmitted in a buffer memory; and

one of said n transmitters receiving an acknowledge signal from an associated hybrid decoder clearing the stored packet in readiness for receipt of another block.

21. The communication system of claim 19 wherein said n transmitters each temporarily store a packet that has been transmitted in a buffer memory; and

one of said n transmitters failing to receive an acknowledge signal from its associated decoder retransmits the packet temporarily stored in its buffer memory.

22. The system of claim 19 wherein one of said n transmitters clears its buffer memory if an acknowledge signal is not received from its associated decoder after a maximum number of retransmissions.

23. The system of claim 19 wherein a maximum number of retransmissions is an operator defined integer having a range from 1 to 8.

24. The system of claim 19 wherein one of said n receivers requiring a retransmission combines a retransmitted packet with an original transmitted packet to facilitate error correction.

25. The system of claim 19 wherein a transmitter failing to receive an acknowledge signal from an associated decoder encodes the packet employing a different encoding technique from an encoding technique employed in an original transmission of that packet.

26. The system of claim 19 wherein the n transmitters employs Turbo coding and the decoder employs code combining of an original transmission and a retransmission to facilitate error correction.

27. The system of claim 19 wherein one of said n transmitters are incorporated in a base station and said n receivers are incorporated in a subscriber unit.

28. The system of claim 19 wherein said n transmitters are incorporated in a subscriber unit and said n receivers are incorporated in a base station.

29. The system of claim 19 wherein packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface in which frequency subchannels in an OFDMA set may be selectively nulled.

30. The system of claim 19 wherein the packets are transmitted using a single carrier with frequency domain equalization (SC-FDE) air interface.

31. The method of claim 19 wherein the acknowledgments are transmitted on a fast feedback channel using a code division multiple access (CDMA) air interface.